

VNMR Shim Methods for CapNMR™ by Dave D. (Jun 2002)

The acquisition software for Varian NMR spectrometers (VNMR) has an automated shimming function that predates the gradient shimming that is widely employed today. While the documentation is not clear, apparently the shims are optimized by some sort of searching/optimization algorithm based user specified fid area or lock signal intensity using shim methods: short cryptic programs that define a shimming protocol. It should be possible to develop a set of shim methods that are geared for installation and maintenance of CapNMR shim files.

Here's an example of a shim method that works on z1 & z2 coarse for 10 minutes:

shim method: f,0,75,t600,szq:cmt;

- f,0,75 shim on the first 75% of the fid
- t600 means shim for a maximum of 600 seconds
- szq means select zq shim set (z1 coarse and z2 coarse)
- :clm means transition from large to medium shim DAC settings

Section 6.9 of the VNMR manual *Getting Started: VNMR 6.1C* contains a complete description of the syntax for constructing shim methods and 'Shimming: New Tools for an Old Problem' is information from an 1995 Varian Magnetic Moments online article. What is need is to try shim methods for the CapNMR are rough protocols for each situation that is to be shimmed. For example, shim methods for installation, solvent changes and high resolution shimming would seem to be good starting points. Here's a 20 minute shim method for 10 minutes of very coarse fid shimming on Z1 followed by 10 minutes of medium fid shimming on z1, x & y which is approximately the first step in shimming the CapNMR probe from scratch.

Shim Method: f,0,50,t600,sz1,cbl,f,0,75,t600,st1,clm;

- f,0,50 shim on the first 50% of the fid
- t600 means shim for a maximum of 600 seconds
- sz1 means select zq shim set (z1 coarse)
- :cbl means transition from very large to large shim DAC settings
- f,0,75 shim on the first 75% of the fid
- t600 means shim for a maximum of 600 seconds
- st1 means select t1 shim set (z1, x, y)
- :clm means transition from large to medium shim DAC settings

I hope I can try these out soon. Also, it seems like it would be possible to do gradient shimming with the z-axis gradient. Furthermore, it looks like it's possible to use the z1 shim coil to create a gradient in the sample and use that to do profile shimming.